

## **Remarks**

### **I. Objection to the Specification**

The disclosure is objected to in view of claim 173. Applicants have amended claim 173 as suggested by the Examiner. Applicants therefore request that the objection to the specification be withdrawn.

### **II. Rejections under 35 U.S.C. § 112**

Claim 264 is rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Claim 264 has been amended to address the antecedent basis noted by the Examiner concerning the guard material. Applicants therefore request that the rejection under 35 U.S.C. § 112, second paragraph, be withdrawn.

### **III. Rejections under 35 U.S.C. § 102**

Claims 159-160, 163-164, 172, 194-195, 203-204, 256 and 258-259 are rejected as allegedly being anticipated under 35 U.S.C. § 102(b) by Sircar's U.S. Patent No. 4,756,723 (Sircar). Applicants traverse the rejection of these claims as allegedly being anticipated by Sircar, and request that these claims be allowed.

Applicants remind Examiner Lawrence that claims 159-166, 171-172, 194-195, 203-204 as currently pending previously were deemed allowable over Sircar. The Examiner's reasons for allowance are as stated in the Notice of Allowability dated March 29, 2004.

Applicants previously amended independent claim 159, from which the remaining rejected claims depend, either directly or indirectly, to include the features of claims 167 and 182. Claim 182 previously was objected to by the Examiner, and hence the amendments to independent claim 159 to include the features of claims 167 (the adsorber including a layer of guard material for controlling flow of at least a portion of the at least one contaminant to the at least one contaminant-sensitive adsorbent material) and 182 (reducing diffusion of the at least one contaminant from the guard material to the at least one contaminant-sensitive adsorbent material) placed independent claim 159, and all claims that depend therefrom, in condition for allowance.

As currently understood, Sircar does not teach using a layer of guard material. Sircar also does not teach reducing diffusion of the at least one contaminant from the guard material to the at least one contaminant sensitive adsorbent material.

For the reasons stated above, applicants request that the rejection of independent claim 159 under 35 U.S.C. § 102 be withdrawn.

Claims 160, 163-164, 172, 194-195, 203-204, 256 and 258-259 depend, either directly or indirectly, from independent claim 159. These dependent claims are allowable for the reasons stated for independent claim 159, and further in view of the patentable combinations of features recited in such dependent claims. Applicants therefore request that the rejection of these claims as being anticipated by Sircar also be withdrawn.

#### **IV. Rejections under 35 U.S.C. § 102(b) over Schaub**

Claims 159-160, 163-164, 172 and 256 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Schaub *et al.*'s U.S. Patent No. 5,989,314 (Schaub). Applicants traverse this rejection and request that it be withdrawn.

Schaub identifies water as a contaminant, and alumina as a material useful for removing water prior to a feed fluid contacting an alumina adsorbent material. Claim 159 states that the method includes “providing an adsorption apparatus comprising at least one adsorber having a feed end and a product end, and including at least one contaminant-sensitive adsorbent material used to produce the at least one product fluid, the adsorber including a layer of guard material for controlling flow of at least a portion of the at least one contaminant to the at least one contaminant-sensitive adsorbent material.” However, the present application defines contaminants particularly to include gases “that will not desorb from the adsorbent at the designed regeneration pressure, in the designed time of this portion of the cycle.” Page 12, lines 21-23. In the Schaub combination, adsorbed water can be desorbed from alumina under the “designed regeneration pressure and designed time for this portion of the cycle”. Specifically, Schaub states that:

Thus, when such adsorbed water is desorbed during the next desorption regeneration portion of the PSA cycle in said vessel, the cooling effect can be readily transferred to the high heat capacity porous material that forms integral regenerative heat exchange zone 4.

Schaub, column 5, lines 26-31. As a result, water is not a contaminant for the combination of a first alumina layer followed by a second alumina adsorbent layer as disclosed by Schaub as the term “contaminant” is defined in this application. Moreover, since water is not a contaminant for the combination taught by Schaub, Schaub also does not teach a contaminant-sensitive adsorbent for purposes of anticipating claim 159. For these reasons, claim 159 is not anticipated, nor is it rendered obvious, by Schaub.

Applicants note that water can be a contaminant for certain adsorbent materials, and combinations of guard materials that are used in combination with adsorbent materials. Moreover, alumina can be useful as a guard material, and is one example of a particular species identified in the present application that helps define the genus of guard materials.

But, for purposes of determining whether Schaub anticipates claim 159, the question is whether the combination recited in Schaub, i.e. a feed fluid comprising water that is first fed to a layer of alumina and then to a second layer of alumina, teaches a feed fluid that has a contaminant and the feed fluid comprising a contaminant is fed first to a guard material and then to a contaminant sensitive adsorbent material. The answer is no in view of the definition of “contaminant,” and hence “contaminant sensitive adsorbent,” as provided by the present application. Schaub therefore does not anticipate claim 159 and the rejection of this claim in view of Schaub should be withdrawn.

The remaining claims depend from claim 159 are not anticipated by Schaub for the reasons stated for claim 159, and further in view of the patentable combination of features recited in these claims.

#### **V. Rejections under 35 U.S.C. § 103(a) over Sircar in view of Dangieri**

Claims 161, 165, 173, 196, 198-199, 202 and 205 are rejected as allegedly being unpatentable under 35 U.S.C. § 103(a) for obviousness over Sircar in view of Dangieri. Applicants traverse this rejection and request that it be withdrawn.

Applicants remind Examiner Lawrence that these claims previously were deemed allowable over Sircar and Dangieri for the reasons stated in the Notice of Allowability dated March 29, 2004.

Independent claim 159 previously was amended to include the features of objected-to claim 182, and claim 182 was canceled. As a result, independent claim 159, and dependent

claims 161, 165, 173, 196, 198-199, 202 and 205, which depend from independent claim 159, are in condition for allowance.

As currently understood, Sircar does not teach using a layer of guard material. Sircar also does not teach reducing diffusion of the at least one contaminant from the guard material to the at least one contaminant sensitive adsorbent material.

Dangieri makes no mention of removing contaminants from a feed fluid, and appears to make no reference to particular contaminants, such as water. Dangieri apparently did not contemplate the problems associated with contaminant degradation and/or deactivation of adsorbents, particularly in a fast cycle, rotary PSA apparatus where adsorbent degradation and/or deactivation is more problematic than in slower, non-rotary systems. Therefore, there is no motivation or suggestion provided by either Sircar or Dangieri to combine the teachings of the two for the combination relied on by the Examiner. Moreover, even if the combination is appropriate, such combination still does not teach or suggest the combination of features recited in claim 159, such as the use of a guard material to control flow of at least a portion of a contaminant to a contaminant-sensitive adsorbent, and reducing diffusion of the at least one contaminant from the guard material to the at least one contaminant-sensitive adsorbent material.

For the reasons stated above, applicants request that the rejection of claims 161, 165, 169, 173, 196, 198-199, 202 and 205 under 35 U.S.C. § 103 be withdrawn.

## **VI. Rejections under 35 U.S.C. § 103(a) over Sircar**

Claim 257 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sircar. Applicants traverse this rejection and request that it be withdrawn.

Applicants remind Examiner Lawrence that claim 257 was allowed over Sircar. Claim 257 depends from claim 159. Applicants previously amended independent claim 159 to include the features of objected-to claim 182 to place the independent claim in condition for allowance. This amendment addressed the rejection of claim 257, and applicants therefore request that this rejection be withdrawn.

**VII. Rejections under 35 U.S.C. § 103(a) over Sircar in view of Dangieri, and further in view of Mattia**

Claims 162, 166 and 197 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Sircar in view of Dangieri, and further in view of Mattia, U.S. Patent No. 4,452,612.

Applicants remind Examiner Lawrence that the claims were allowed over Sircar.

Claims 162, 166 and 197 depend from independent claim 159. Applicants previously amended independent claim 159 to include the features of objected-to claim 182 to place the independent claim in condition for allowance. This amendment also addressed the rejection of claims 162, 166 and 197.

For the reasons stated above, applicants request that the rejection of claims 76, 162, 166, 170 and 197 as allegedly being obvious over Sircar in view of Dangieri, and further in view of Mattia, be withdrawn.

**VIII. Objections to Claims**

Claims 174, 178, 184, 188, 190-193, 200-201, 206-255 and 260-263 are objected to as being dependent upon a rejected base claim. However, these claims ultimately depend from independent claim 159, and hence are allowable for the reasons stated above with respect to independent claim 159, and further in view of the patentable combination of features recited in such claims.

The present application is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,

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